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Report of the

U.S. Antarctic

Program

External

Panel

APPENDIX I.

BIOGRAPHIES OF MEMBERS

CHAIRMAN:

Norman R. Augustine Mr. Augustine, Chairman of the U.S. Antarctic Program External Panel, is Chairman and Chief Executive Officer of the Lockheed Martin Corporation. He has served as Chairman of the Defense Science Board, the National Academy of Engineering, the White House/NASA Advisory Committee on the Future of the U.S. Space Program, and the Aeronautics Panel of the Air Force Scientific Advisory Board, as well as President of the American Institute of Aeronautics and Astronautics. He holds a B.S.E. and M.S.E. from Princeton University, is the recipient of more than 10 honorary degrees and is a member of the American Academy of Arts and Sciences. He has served as a Trustee of Princeton University and Johns Hopkins University, and as a member of the Advisory Board of The Johns Hopkins School of Medicine. He is a former Assistant Director of Defense Research and Engineering in the Office of the Secretary of Defense and a former Under Secretary of the Army. Mr. Augustine has been to Antarctica twice and to the South Pole once.

MEMBERS:

Richard Alley Dr. Alley is a Professor of Geosciences and Associate of the Earth System Science Center at Pennsylvania State University, University Park, where he has worked since 1988. He graduated with a Ph.D. in 1987 from University of Wisconsin and earned M.S. (1983) and B.S. (1980) degrees from Ohio State University, all in Geology. Dr. Alley teaches and conducts research on the climatic records, flow behavior, and sedimentary deposits of large ice sheets to aid in prediction of future changes in climate and sea level. He is a Packard Fellow, a former Presidential Young Investigator, and the 1996 recipient of the Horton Award of the American Geophysical Union Hydrology Section. Dr. Alley has served on a variety of advisory panels and steering committees for the National Science Foundation, targeted research activities, and professional societies. His Polar experience includes three field seasons in Antarctica, one to the Pole and five in Greenland.

John B. Anderson Dr. Anderson is Professor and Chairman of the Department of Geology and Geophysics at Rice University. He earned his Ph.D. from Florida State University, an M.S. from University of New Mexico and a B.S. from University of South Alabama. He has published 160 articles and has written 150 abstracts, most dealing with Antarctic marine geology and coastal evolution. He has written or contributed to three books — *Glacial Marine Sedimentation*, *Paleoclimatic Significance of Glacial Marine Deposits*, and *Antarctic Marine Geology*. Dr. Anderson was the Associate Editor of *Geology* from 1991 to 1993. He currently serves on the editorial boards of the American Association of Petroleum Geologists and the American Geophysical Union-Antarctic Research Series. He is a member of the National Academy of Sciences Polar Research Board, and a member of the Steering Committee-West Antarctic Ice Sheet Study. He received the 1992 Gulf Coast Association of Geological Studies Outstanding Educator Award and the 1996 Rice University Graduate Teaching Award. Dr. Anderson has made 18 expeditions to Antarctica and the Southern Ocean region.

Rita R. Colwell Dr. Colwell is President of the University of Maryland Biotechnology Institute and Professor of Microbiology. She received her B.S. and M.S. degrees from Purdue University and her Ph.D. from the University of Washington, Seattle. Dr. Colwell has received several honorary degrees, including an honorary Doctor of Science from her Alma Mater, Purdue University. Dr. Colwell was named the 1996 Maryland Legislature Outstanding Woman of the Year. Her other awards include the Medal of Distinction from Barnard College, Columbia University; Andrew White Medal, Loyola College; Purkinje Gold Medal, Czechoslovakia Academy of Sciences; the Maryland State Civic Award (presented by Governor Schaefer); and the Fisher Award, American Society for Microbiology. Dr. Colwell is a past President and Board Chairman of the American Association for the Advancement of Science and has served as President of the International Union of Microbiological Societies, the American Society of Microbiology, and Sigma Xi. She is a Member of the Health and Environment Research Advisory Committee (HERAC), Department of Energy; Board of Trustees, International Centre for Diarrhoeal Disease Research, Bangladesh; and Science Board, Food and Drug Administration. Dr. Colwell chaired the Crary Science and Engineering Center Panel, Division (now Office) of Polar Programs, and the Polar Research Committee, National Science Board, and served as Vice-Chair, Polar Research Board, National Academy of Sciences. Dr. Colwell has traveled to Antarctica four times and has made four trips to the South Pole.

Charles E. Hess Dr. Hess is Director of International Programs at the University of California, Davis. He earned his Ph.D. in Physiology, Horticulture and Plant Pathology and an M.S. degree from Cornell University, and holds an B.S. degree from Rutgers University. He is a former Assistant Secretary for Science and Education at the Department of Agriculture. He served as a Member and Vice-Chair of the National Science Board, Member of the U.S. Antarctic Safety Review Panel, and Member of the NSB Committee on the National Science Foundation Role in Polar Regions, which recommended the construction of the Crary Science and Engineering Center. Dr. Hess has made five trips to Antarctica and four trips to the South Pole.

Hansford T. (H.T.) Johnson General Johnson, USAF (Ret), is Chairman of the Greater Kelly Development Corp. in San Antonio, Texas. He is responsible for leading the transformation of the \$7.5 billion Air Force depot into an industrial center that will perform government and commercial work. He served as the President and CEO of USAA Capital Corp. and was a member of the 1993 Base Closure Commission. As Commander in Chief of the U.S. Transportation Command, he led the movement of the troops and equipment to Panama in 1989 and the Persian Gulf in 1990-91. His command was also responsible for the air and sea lift to Antarctica, and he landed a C-5 Galaxy on the ice at McMurdo Station in 1991. Gen. Johnson was the Deputy Commander of the U.S. Central Command during the escorting of the Kuwaiti tankers through the Persian Gulf and Head of Operations in the Strategic Air Command during the raid on Libya in 1986. Gen. Johnson's responsibilities have included balancing Air Force programs at successive lower levels during a period of "downsizing." He was a combat pilot in Vietnam and was a graduate of the first class — and later served as Assistant Professor — of the USAF Academy. He holds Masters Degrees from Stanford in Aeronautics and Colorado in Business. Gen. Johnson has been to Antarctica twice and the South Pole once.

Lewis E. Link, Jr. Dr. Link is the Director of Research and Development of the U. S. Army Corps of Engineers. Prior to this assignment, he served as the Director and Technical Director of the U. S. Army Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire, and Fairbanks, Alaska, the principal federal center of expertise for cold regions engineering research serving both the Department of Defense (DoD) and civilian agencies. He has served as the Assistant Chief of the Corps at the Coastal Engineering Research Center and has been active in

research, publishing over 90 technical papers and reports. He has served on or chaired advisory boards and technical committees for NASA, American Society of Civil Engineers, Society of American Military Engineers, American Society of Mechanical Engineers, NATO, the Department of Defense, and various universities. Dr. Link earned a Ph.D. in Civil Engineering from Pennsylvania State University, a M.S. in Civil Engineering from Mississippi State University and a B.S. in Geological Engineering from North Carolina State University. Dr. Link has been to Antarctica twice and to the South Pole twice.

Rudy K. Peschel Rear Admiral Peschel, recently retired from the U.S. Coast Guard as Chief, Office of Navigation, overseeing that agency's polar operations, among other responsibilities concerning international and domestic waterway safety. Early-career aviation and sea duty took him to Arctic regions during the North Slope oil discovery and transportation development. Headquarters and field command billets involved him in capital planning, resource justification to the Office of Management and Budget and Congress, and major base transitions from the Department of Defense to USCG management. He was Deputy Commander of the multi-agency/multi-nation Western Hemisphere Drug Traffic Task Force and Commander of the ice-intensive Great Lakes District. He spent part of the 1996 icebreaking season at McMurdo Station and aboard *USCGC Polar Star*. He graduated in 1963 with a B.S. in Engineering from the U.S. Coast Guard Academy, in 1966 from Navy Flight Training at Pensacola, and in 1972 from Naval Postgraduate School at Monterey with an M.S. in Management Science. Adm. Peschel has been to the Antarctic and the South Pole twice.

Russell L. (Rusty) Schweickart Mr. Schweickart is President and CEO of ALOHA Networks, Inc. (ANI). He received his B.S. and M. S. degrees from the Massachusetts Institute of Technology in 1956 and 1963. He served in the Air Force and the Massachusetts Air National Guard as a fighter pilot. Selected by NASA in the third group of astronauts in 1963, he flew as the Lunar Module Pilot on Apollo 9's flight to the Moon in March 1969. He served as Commander of the backup crew on the first Skylab mission and subsequently as a Program Manager at NASA Headquarters. In 1977, he joined the administration of Governor Jerry Brown of California as his Advisor for Science and Technology. Appointed by the Governor to the California Energy Commission in 1979, Mr. Schweickart served as its Chairman for five years. In 1985, he founded the Association of Space Explorers, the professional organization of astronauts and cosmonauts,

and was later the founder and president of Courier Satellite Services, Inc., and Executive Vice President of CTA Commercial Systems, Inc. In 1987-88, Mr. Schweickart chaired the National Science Foundation's Antarctic Safety Review Panel producing the "Safety in Antarctica" report. Mr. Schweickart has been to Antarctica three times and to the South Pole twice.

Susan Solomon Dr. Solomon is a Senior Scientist at the National Oceanic and Atmospheric Administration's Aeronomy Laboratory. She served as Head Project Scientist for the National Ozone Expedition at McMurdo Station, Antarctica, in 1986-7, and has been a leader in ozone research for more than a decade. Her theoretical and observational work was key to identifying the cause of the Antarctic ozone hole, and she has received numerous honors in recognition of those studies. She is a Member of the U. S. National Academy of Sciences and a foreign associate of the French Academie des Sciences. She has previously served as Chair of the Advisory Committee for the National Science Foundation's Division of Polar Programs and as a member of the Polar Research Board, National Research Council. She earned her M. S. and Ph.D. degrees in chemistry from the University of California, Berkeley, her B. S. degree from the Illinois Institute of Technology, and

she has three honorary doctorate degrees. Dr. Solomon has been to Antarctica four times and to the South Pole once.

Edward C. Stone Dr. Stone has been Director of the Jet Propulsion Labotatory (JPL) since January 1991, and a Vice President and David Morrisroe Professor of Physics at California Institute of Technology. He earned his M.S. and Ph.D. degrees in Physics from the University of Chicago. He is Chairman of the California Association for Research in Astronomy, which is responsible for the W. M. Keck Observatory in Hawaii. Dr. Stone is a Member of the National Academy of Sciences, the American Philosophical Society and the International Acacemy of Astronautics, and received the National Medal of Science from President Bush. He has been an investigator on 14 NASA missions and served as the Chief Scientist for the Voyager Mission. He has been to Antarctica once and to the South Pole once.

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The Panel expresses its heartfelt appreciation to Laura Cooper Herrera who handled all the mechanics of preparing the text of this report.

OFFICE OF THE
DIRECTOR**TERMS OF REFERENCE**
United States Antarctic Program External Panel*Report of the**U.S. Antarctic**Program**External**Panel***BACKGROUND**

In its April 1996 report on the United States Antarctic Program (USAP), the National Science and Technology Council (via its Committee on Fundamental Science), determined that:

“The National Science Foundation has implemented U.S. policy in an effective manner”

“the USAP research program is of very high quality”

“at the current level of investment, the USAP is cost effective in advancing American scientific and geopolitical objectives; from a science perspective, the NSTC supports the continuation of three stations with year-round presence.”

“maintaining an active and influential presence in Antarctica, including year-round operation of South Pole Station, is essential to U.S. policy interests”.

The NSTC also recognized, however, that budgetary uncertainties place a premium on detailed understanding of cost reduction options. Thus, the NSTC recommended that “an external panel be convened by NSF to explore options for sustaining the high level of USAP science activity under realistic constrained funding levels.”

PANEL CHARGE

The report suggests that the panel should “examine a full range of infrastructure, management, and scientific options.” In particular, I request that the panel examine and make recommendations concerning: the stations and logistics systems that support the science while maintaining appropriate environmental, safety, and health standards; the efficiency and appropriateness of the management of these support systems; and how and at what level the science programs are implemented. The panel’s views and recommendations should include consideration of eventual replacement of South Pole Station and other infrastructure.

The panel's advice is sought on how the USAP can maintain the high quality of the research program and implement the U.S. policy in Antarctica under realistic budget scenarios.

The Administration's projections are that the overall National Science Foundation budget will decrease somewhat through fiscal year 2000 before increasing with inflation for the subsequent two years. Thus, one scenario that should receive particular attention is that corresponding to a budget freeze for the USAP science program and infrastructure, including South Pole Station. Purchasing power would decrease by approximately 15% between now and the year 2002 in this scenario. Supplemental funding from other federal agencies or other sources within NSF should not be assumed, but the panel is encouraged to consider best practices developed by these agencies and the private sector in operating remote facilities, as well as new technologies (e.g., robotics) and approaches that could yield further efficiencies and cost savings. NSF looks to the Panel to recommend promising approaches and investments that can produce significant long-term savings in the USAP.

In considering other scenarios, the panel is encouraged to identify areas in which substantial increases in program effectiveness would result from resource reallocations or short-term changes in budget profiles. Capital investments that lead to overall reductions in life-cycle costs should receive careful attention under all budget scenarios considered.

NSF will evaluate and seek to implement the recommendations of the panel to the extent practical within the context of overall budget constraints and competing requirements.

EXPECTED OUTPUT

Input to the FY 1998 budget process is highly desirable (October - December 1996 timeframe), and thus the panel is asked to report in two phases.

1) In the first phase, options for cost savings within the current program scope should be explored and recommendations developed for how these cost savings could best be applied to meet the science, foreign policy, and national security objectives of the USAP. A useful specific target might be seeking savings adequate to support South Pole Station replacement within the current budget envelope. These results, provided late in 1996, will furnish a useful benchmark for the budget process and for the Panel's further deliberations.

2) In the second phase, the Panel is asked to examine the full range of options available to optimize the Antarctic program at various funding levels.

In its deliberations the panel should consider:

- priority, scope, and scale of the various science programs
- options for use and levels of activity at research stations, field camps, and research vessels
- changes in logistics and supply operations to optimize delivery of science.
- increased use of robotic or other automated technologies and possible reductions in on-site presence of program personnel.
- cost sharing with international partners at a program and infrastructure level.
- investments that over the long term would improve the program and reduce life-cycle costs .

The report should include a summary of the panel's recommendations on maintaining an effective program in the various scenarios, with an explicit statement of the assumptions and tradeoffs made.

The panel charge is complex, but I ask that the panel provide its final report to me in early 1997. The recommendations will guide me in my planning and policy discussions within the NSF and NSB, as well as with OSTP, OMB, and the Congress as we seek to sustain the high quality USAP science programs and maintain an active and influential presence in Antarctica in the face of budget realities.



Neal Lane
Director
National Science Foundation
August 2, 1996